CLAIMS

We claim:

1. A method of forming optically transparent and electrically conductive single walled carbon nanotubes (SWNT) films, comprising the steps of:

providing a porous membrane;

dispersing a plurality of single walled carbon nanotubes (SWNTs) into a solution, said solution including at least one surface stabilizing agent for preventing said SWNTs from flocculating out of suspension;

applying said solution to said membrane, and

removing said solution, wherein said SWNTs are forced onto a surface of said porous membrane to form a SWNT film disposed on said membrane.

2. The method of claim 1, further comprising the step of separating said SWNT film from said porous membrane.

3. The method of claim 2, wherein said separating step comprises dissolving said membrane.

4. The method of claim 1, wherein said surface stabilizing agent comprises at least one surfactant.

5. The method of claim 1, wherein said membrane comprises a polymer.

6. The method of claim 1, further comprising the step of doping said SWNT film.

7. The method of claim 6, wherein said doping comprises adding at least one dopant to said SWNT film, said dopant selected from the group consisting of halogens and alkali metals.

8. The method of claim 1, wherein said SWNT film provides at least 10% optical transmission thoughout the wavelength range from 0.4 μm to 10 μm.

9. The method of claim 8, wherein a thickness of said SWNT film is at least 100 nm.

10. The method of claim 1, wherein said SWNT film provides at least 50% optical transmission throughout the wavelength range from 3 μm to 5 μm.

11. The method of claim 10, wherein a thickness of said SWNT film is at least 100 nm.

12. The method of claim 1, wherein said SWNT film provides a sheet resistance of less than 200 ohm/sq at a thickness of 100 nm.

13. An optically transparent and electrically conductive single walled carbon nanotubes (SWNT) film, comprising:

a plurality of interpenetrated single walled carbon nanotubes, wherein said film provides a sheet resistance of less than 200 ohm/sq and at least 30% optical transmission at a wavelength of 3 μm.

14. The SWNT film of claim 13, wherein said 30% transmission is provided at a wavelength of 5 μm.

15. The SWNT film of claim 13, wherein said 30% transmission is provided at a wavelength of 10 μm.

16. The SWNT film of claim 13, wherein said film includes at least one dopant.

17. The SWNT film of claim 14, wherein said dopant is selected from the group consisting of halogens and alkali metals.

18. The SWNT film of claim 13, wherein said SWNT film provides at least 10% optical transmission throughout the wavelength range from about 0.4 μm to 10 μm at a thickness of at least 100 nm.

19. The SWNT film of claim 13, wherein said SWNT film provides at least 50% optical transmission throughout the wavelength range from about 3 μm to 5 μm at a thickness of at least 100 nm.

20. The SWNT film of claim 13, wherein said SWNT film provides said sheet resistance of less than 200 ohm/sq at a thickness of 100 nm.